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scientific knowledge, policies, or practices.
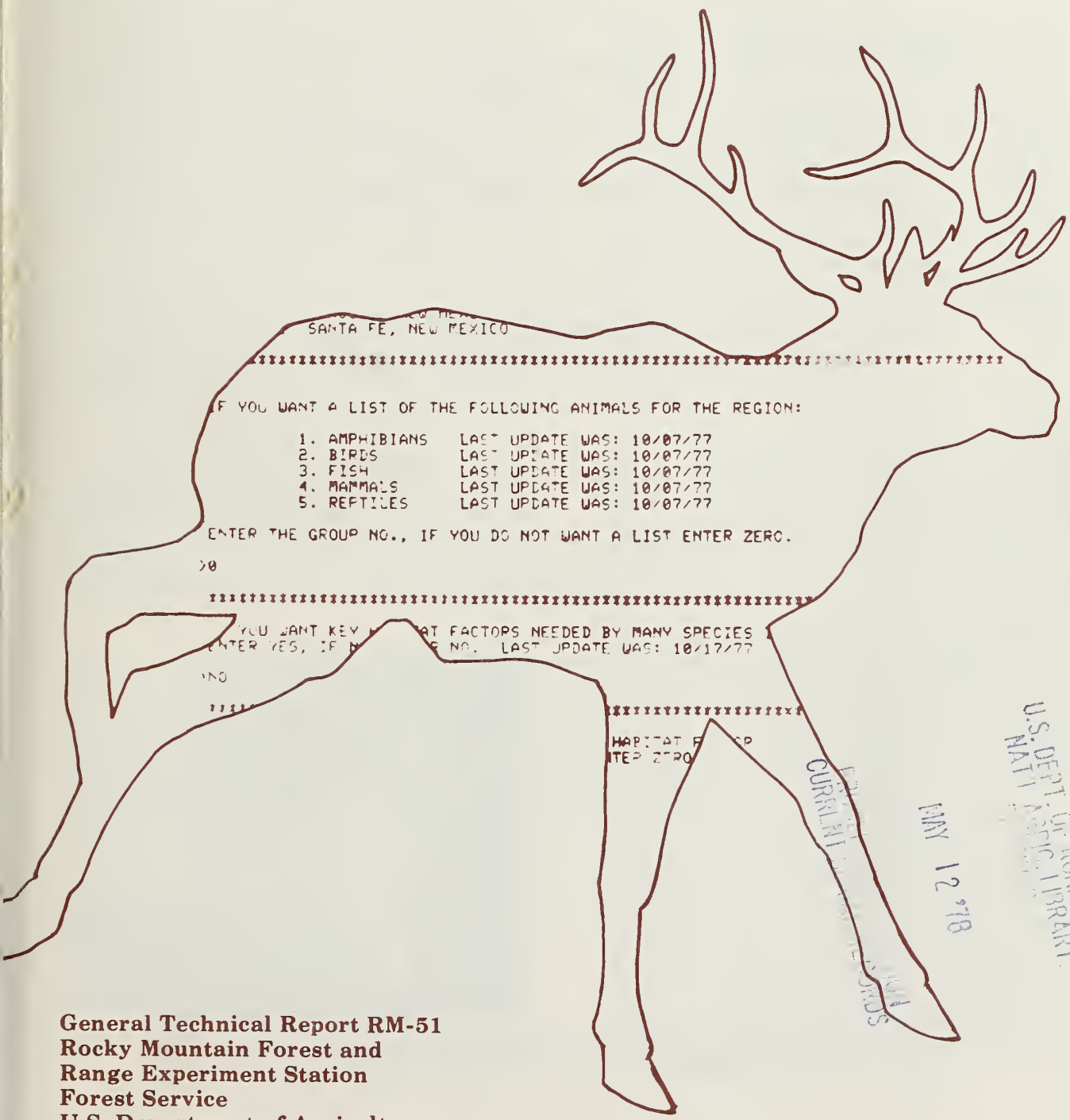
CORE LIST

RUN WILD

A Storage and Retrieval System for Wildlife Habitat Information

David R. Patton

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             SANTA FE, NEW MEXICO

    XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX

F YOU WANT A LIST OF THE FOLLOWING ANIMALS FOR THE REGION:

        1. AMPHIBIANS   LAST UPDATE WAS: 10/07/77
        2. BIRDS        LAST UPDATE WAS: 10/07/77
        3. FISH         LAST UPDATE WAS: 10/07/77
        4. MAMMALS      LAST UPDATE WAS: 10/07/77
        5. REPTILES     LAST UPDATE WAS: 10/07/77

ENTER THE GROUP NO., IF YOU DO NOT WANT A LIST ENTER ZERO.

    >0

    XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX

        YOU WANT KEY      AT FACTORS NEEDED BY MANY SPECIES
    NTER YES, IF N        NO.  LAST UPDATE WAS: 10/17/77

    >NO

    XXXX                              XXXXXXXXXXXXXXXXXXX

                              HABITAT F    CR
                              TER ZERO
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General Technical Report RM-51
Rocky Mountain Forest and
Range Experiment Station
Forest Service
U.S. Department of Agriculture

RUN WILD

A Storage and Retrieval System for Wildlife Habitat Information

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Abstract

RUN WILD is a computer program written in conversational mode to allow the user to list factors in the environment that are associated with 721 vertebrate species in Arizona and New Mexico. A management file provides information on species distribution, protection status, key habitat factors, and food and cover requirements. References for each species are contained in a separate file. Although the system was developed for the Southwest, its format can be used for any geographical area.

RUN WILD.
A Storage and Retrieval System for
Wildlife Habitat Information

David R. Patton

Background

The Need

For several years, field biologists and land managers have needed a system to store wildlife habitat data in a computer in a format that is easy to retrieve and use. Voluminous amounts of information now available in the literature have become unmanageable. In addition, new information is accumulating so rapidly that field biologists can not possibly read and assimilate all these research results.

In 1973, John McGuire, Chief of the Forest Service stated:

> "After 60 odd years of management and collecting data I have to ask, who has better knowledge and data? ... I will agree that we need to continue to improve our data base, but first let's learn to use what we have and what is available."

As a follow-up to the Chief's remarks, Dale Jones, Bill Russell, and Charles Kennedy of the Forest Service Region 3 Office in Albuquerque, N. Mex. started developing a storage and retrieval system that could be accessed from remote computer terminals (fig. 1). Their work resulted

Figure 1.—Wildlife data are received and printed by a console at a remote terminal.

in a basic program called "WILD" which, in 1974, was stored on the Forest Service computer in Fort Collins, Colo.

It soon became apparent that program WILD could be modified and expanded to contain more exact information for a variety of users and management situations by including a management and reference file for each species in Arizona and New Mexico. The Rocky Mountain Forest and Range Experiment Station's Wildlife Research Work Unit at Tempe, Ariz., assumed the responsibility for developing the existing WILD program into a working tool for planning and decisionmaking on southwestern National Forests. This paper reports the results of that 2-year effort. The final product is now named "RUN WILD".

Concepts Considered

There seem to be two general concepts of wildlife management developing in North America. One is species diversity, where many wildlife species coexist in a plant community. In this case, some species will benefit from a given successional stage more than others, and management is directed at maintaining the physical factors of the environment where different species feed and reproduce. The second is featured species, which gives priority to one species, but also benefits others with the same requirements. Management is directed toward maintaining adequate food and cover for the priority species. The RUN WILD system had to be usable in either of these management situations.

Another important consideration was whether to use other programs that were already available. Review of other storage and retrieval programs, led to the conclusion that they could not be used by field biologists without interpretation. Some programs provided only abstracted material from the literature; others, while containing good, general information, could not be used for specific problems in local areas, still other programs were not available to the field biologists.

These problems indicated the need to work directly with field personnel to develop a useful storage and retrieval system.

Overview of RUN WILD

Potential users of the system were asked what types of decisions they made and what data they needed. From these responses, a flow chart gradually developed that provided the necessary format for a working tool (fig. 2).

Currently, the RUN WILD system has seven files, as outlined by the flow chart. These seven files contain three levels of information for different inventory and assessment needs. The first three files in Level I are general lists which provide a wildlife resource inventory for Arizona and New Mexico. Level II files are more specific, and contain two files of species habitat associations. Level III provides management information and references for individual species.

After the flow chart was completed, the next step was to write the computer program for accessing the files and to start collecting and entering data. At this point, some decisions had to be made about storage limits and how the data could be collected systematically for easy key punching. A supplement to this paper will contain the actual program and will discuss the storage limits, how the program is entered in the computer and procedures for updating files[2]. It was decided that statements in the management file had to be short and concise if the system was to be of practical use. To accomplish this, a form was developed that contained 60 lines with each line representing an 80-column computer card (fig. 3).

While the form might at first appear too restrictive, using codes gives the form unlimited usefulness. Designing the form in computer card format makes it easy to keypunch the data. The categories on the form are exactly those used to store data in the management file.

[2]Casner, Wilson B., Barbara Kulongowski, David R. Patton, and Sandy J. Pinkerton. RUN WILD—Implementation and maintenance. Supplement to RUN WILD—A storage and retrieval system for wildlife habitat information. In press.

The Basic System

The RUN WILD program is written in conversational mode, and allows the user to respond to specific questions to get the results shown in the flow chart. Only simple answers such as "yes", "no", 0, 1, or 2, etc. are entered in the keyboard. Since the console is similar to a typewriter, the number of entry errors is low because most people have used a typewriter. Keeping the entries short also reduces error.

At the beginning of the RUN WILD program, there are two options available. These options allow either the user or the computer to take control. If the computer takes control of the program, the questions will be asked in the sequence shown on the flow chart. A response is required for each question before the next one will be printed. This option is recommended until the user becomes familiar with the system and data files.

The second option saves time for experienced users. When this option is selected, all the questions are printed at the start of the program. The user selects a number corresponding to the question and enters it in the console; the computer will go directly to that file.

One feature of the system that eliminates duplication is the printing of the date that new data were entered in the files. This allows the user to compare dates with previous printouts to see if he has current information. If his printout date matches that printed for each file, he does not have to ask for another printout. This feature of the program reduces printing time, especially in Level I where the files contain long inventory lists.

Access to the computer is by telephone. Once the proper tone is obtained, the receiver is inserted in the console, and the program is ready to operate. After user identification numbers are entered in the keyboard and accepted, the console printer will start the program by asking the user to select an option. Once the option is selected, information in the files can be obtained. A description of each file follows.
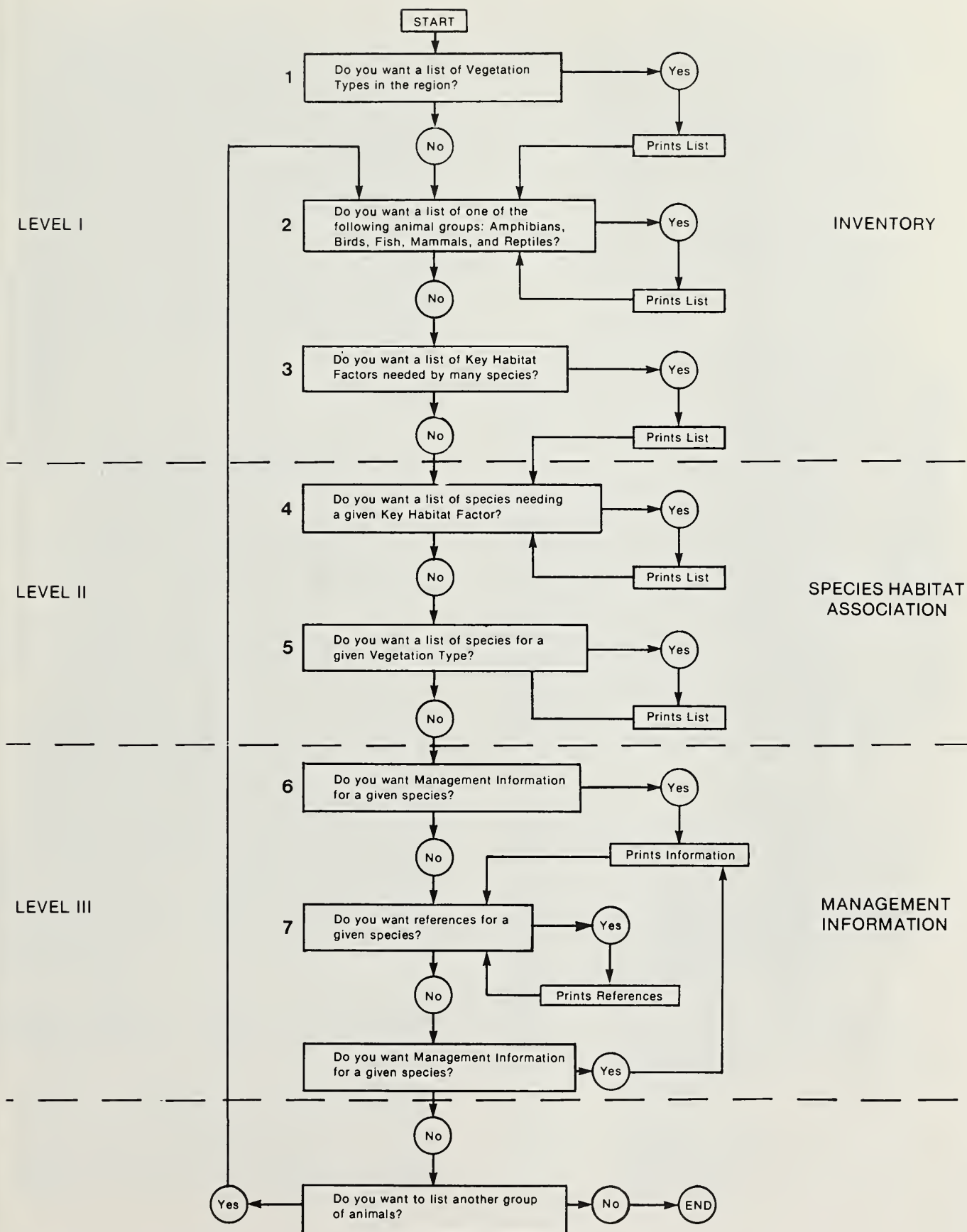
Figure 2.—RUN WILD flowchart.

SPECIES INFORMATION CODING FORM

RUN WILD

Information will appear in the file exactly as coded.

Animal Name (common and scientific)

Col 7-75, Line 1

Figure 3.—Species coding form.

Additional Information

Include references on back of sheet -
Use Journal of Wildlife Management styles; List references alphabetically
and use numbers - R1, R2, R3, etc.

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List of Vegetation Types

If the user requests this, he will receive a list of those vegetation types that have data associated with wildlife species in Arizona and New Mexico. For each type, the list will contain a sequential index number, an identification number, and a type name. The identification (ID) number associates the vegetation type to a hierarchical system of classification for Arizona and New Mexico (Brown and Lowe 1974). The ID number is not used in the program but is shown to reference the type to a published document that provides more detail. The index number is the one used to obtain information from the computer. An example of a printout follows.

Index No.	ID No.	Name
24	221.000	Montane conifer forest
25	221.100	Douglas-fir-white fir series
29	221.104	Populus tremuloides subclimax associations
30	221.200	Pine series
32	221.202	Pinus jeffreyi associations
36	221.206	Pinus ponderosa-encinal ecotone associations
37	221.207	Populus tremuloides subclimax associations
38	222.000	Relict conifer forest
39	222.100	Cypress postclimax series
41	223.000	Riparian deciduous forest

In the example, some index numbers are missing. Although there are approximately 350 categories of vegetation (biome, series, associations) in Arizona and New Mexico, only those with associated wildlife species are printed. This saves printing costs. In the vegetation hierarchy, wildlife species are included for the biome and lower levels. In most cases, the lowest level will be an association. For example, the Montane Conifer Forest Biome (221.000) includes the Pine Series (221.200) and Pinus jeffreyi associations (221.202).

List of Species in One of Five Wildlife Groups

The five groups are (1) Amphibians, (2) Birds, (3) Fish, (4) Mammals and (5) Reptiles. The species in the file will be listed by group. Users are allowed to list all five groups or one or more groups in combination. An example of a printout follows:

Group No. 1

Index No.	Name
8	Frog, Northern cricket (*Acris crepitans*)*
9	Frog, Pacific tree+ (*Hyla regilla*)*
10	Frog, Tarahumara (*Rana tarahumarae*)*
11	Salamander, Jemez Mountain (*Plethodon neomexicanus*)*
12	Salamander, Sacramento Mountain (*Aneides hardii*)*
13	Salamander, Tiger (*Ambystoma tigrinum*)
14	Toad, Colorado River (*Bufo alvarius*)*
15	Toad, Couch's spadefoot (*Scaphiopus couchii*)
16	Toad, Eastern narrow-mouth (*Gastrophryne carolinensis*)*
17	Toad, Great Basin spadefoot (*Scaphiopus intermontanus*)

The group number is the designated number for that wildlife group (e.g. Amphibians (1), Birds (2), etc.). The index number is the sequence number of the species within the particular group file. Group and index numbers are used later in the program to obtain management information and references by species. Each animal list obtained is in alphabetical order by common name (e.g. Frog, Pacific tree+). A plus sign (+) indicates that the word preceding the sign (tree) is part of one-word name (e.g. treefrog), but is alphabetized by another part of the one-word name (e.g. frog not treefrog). An asterisk (*) following the scientific name indicates either the species or a subspecies is on federal or state threatened or endangered lists. Subspecies are not listed separately, but information is available under the species name in the management file.

List of Key Habitat Factors

A key habitat factor is a physical requirement important for survival of the species sometime during its life cycle. Key habitat factors conform somewhat to the species life form as outlined by Thomas et al. (1976). The factors are listed on the printout by index number and name. An example of a printout follows.

Index No.	Name
1	Sycamore trees
2	Cottonwood trees
3	Walnut trees
4	Alder trees
5	Emergent Plants
6	Mistletoe
7	Dead trees and snags
8	Aspen trees
9	Willow thickets
10	Mature saguaros

List of Wildlife Species Needing a Key Habitat Factor

The purpose of this file is to accumulate species with similar requirements so that different species can be managed as a group instead of individually. It is hoped that, after enough data have accumulated in the file, several species will begin to emerge as indicators for that group needing that particular key habitat factor. An example of a printout follows.

Following is a list of animals needing habitat factor: 8

Aspen Trees

Group No.	Species No.	Name
2	19	Chickadee, Black-capped (*Parus atricapillus*)
2	217	Sapsucker, Williamson's (*Sphyrapicus thyroideus*)
2	218	Sapsucker, Yellow-bellied (*Sphyrapicus varius*)
2	311	Woodpecker, Hairy (*Picoides villosus*)

List of Wildlife Species Associated with a Particular Vegetation Type

The user furnishes the index number from the vegetation type list printed previously and is given the group number, index number (species number) and names of those wildlife species in that vegetation type. An example of a printout follows.

Following is a list of animals in vegetation type:

Pine Series

ID NO.: 221.200   INDEX NO.: 30

Group No.	Species No.	Name
2	303	Warbler, Yellow-rumped (*Dendroica coronata*)
2	307	Woodpecker, Acorn (*Melanerpes formicivorus*)
2	311	Woodpecker, Hairy (*Picoides villosus*)
2	313	Woodpecker, Lewis' (*Melanerpes lewis*)
2	314	Woodpecker, Northern three-toed (*Picoides tridactylus*)
2	322	Wren, Winter (*Troglodytes troglodytes*)
4	35	Deer, White-tailed (*Odocoileus virginianus*)
4	139	Squirrel, Abert (*Sciurus aberti*)*
4	145	Squirrel, Red (*Tamiasciurus hudsonicus*)
5	5	Lizard, Arizona alligator (*Gerrhonotus kingii*)

Besides having data in the file associating species with vegetation types, a map is available for Arizona and New Mexico that delineates the types at the Biome level (Brown et al. 1977). The hierarchical number and name in the file is keyed to the map. The species that are listed for any particular vegetation hierarchy have been identified as occurring in that type. The list identifies the potential, and may not indicate what is actually in a given area.

Management Information

This file contains specific information on each species of amphibian, bird, fish, mammal, and reptile that occurs in Arizona and New Mexico. Seven categories are available in the file.

1 = General distribution
2 = Protection status
3 = Vegetation types
4 = Food habits
5 = Cover requirements
6 = Key habitat factors
7 = Management practices

The user can request any or all categories to be printed. Group and index numbers are used to recall the data from the file. An example of a printout follows.

Following is management information for Group 2   Species 106

Species Name: Hawk, Black (*Buteogallus anthracinus*)*

General distribution

Counties - 2, 7, 9, 12, 17, 23, 36 . . .

National Forests - 0, 1, 2, 6, 9

Protection Status

Arizona	-Native 3
New Mexico	-Native 2
Federal	

Vegetation Types

223.1, 223.2 (Breeding)

Food Habits

Amphibians, reptiles, small fish, insects, small animals. R5

Cover Requirements

Tall riparian vegetation i.e. cottonwoods and sycamores. R1

Key Habitat Factors

Must have permanent streams as part of its riparian breeding habitat. R1

Management Practices

The species is very shy during breeding. Disturbance by humans should be prohibited to prevent nest desertion. Stream channelization, phreatophyte eradication and other practices destructive to riparian areas are detrimental to this species. R1

Comments

Rare summer resident. R3 R4
Population can probably be increased somewhat by revegetation of riparian habitat along stream courses and by the protection of nesting areas from human activities. R1
Buteogallus anthracinus anthracinus endangered subspecies.

For general distribution, counties in Arizona and New Mexico are coded and listed in a users handbook. In addition, there may be comments on distribution that appear on the printout. Names of National Forests are also coded.

Both Arizona and New Mexico have categories designating the status of their threatened or endangered species. This information is coded and appears in the Protection Status section. One of the codes will appear after the state name. The Black Hawk (our example) is in category 3 for Arizona and 2 for New Mexico. In addition, if a species is trapped, hunted, or fished, the word "recreation" will appear for the appropriate state. The words "native" or "introduced" can also appear after the state name.

The Vegetation Types Section may contain information on the species use of a type for a particular activity (breeding, feeding, cover) or season (fall, winter, etc.). The hierarchical number is the lowest level to which the species has been identified.

References

In many cases, statements in the management file have an identifying number such as R1, R5, etc. These numbers refer to literature citations and personal communications. To obtain the references for a given species, the group number and species number (Index No.) is entered in the console. An example of a printout follows.

Following is a list of references for the animal called

Salamander, Jemez Mountain (*Plethodon neomexicanus*)·
  Group No. - 1   Species No. - 11

1 - Lowe, C. H. 1964. The vertebrates of Arizona. Univ. of
1   Ariz. Press, Tucson. 259 p.
2 - Stebbins, R.C. 1954. Amphibians and reptiles of west-
2   ern North America. McGraw-Hill, N.Y. 563. p.
3 - Stebbins, R.C. 1966. A field guide to western amphib-
3   ians and reptiles. Houghton Mifflin Co., Boston.
3   279 p.
4 - Vandevender, T. 1977. Personal communication.
5 - Cross, J.K. 1977. Personal communication.

After references have been obtained for the desired species, they can be printed for a different one. Each species reference file can have as many as 60 citations listed, and it is not necessary to have them all printed at once. The question on species management and references is a loop (see flow chart), and one can stay in this loop until information on all species in the file has been printed.

Flexibility of the System

Although RUN WILD was developed for wildlife habitat information for Arizona and New Mexico, the basic computer program can be used for other geographical areas. Limits on records for any particular file are imposed by programmers and can be changed as the need dictates. The main program was written in Fortran IV which is accepted by most computers. However, some statements may have to be changed depending on the compiler used. The situation is no more complex than adapting a program for one computer that was written for another.

The key to success in developing a usable storage and retrieval system is the data form, such as used in the current program. This form contains all the data pertinent to the seven files in RUN WILD. References do not show on the front but are on the back of the form. Once data have been punched on cards, it is simple to write programs to create files in any desired manner. One example is to associate species with counties. This is not done in the current RUN WILD, but the data are available in the management file. In our case, county information is always located on cards 3, 4, 5, and 6. A program can be written to search these cards in the management file, store the information in a separate file, and then, at the end, print the species associated with all the counties. This is the manner in which files are developed from data already stored on punched cards. New file additions to the RUN WILD system can be located any place in the flow chart. However, excess storage costs money, so the space should be used sparingly. Again, the key to success is short, concise statements and liberal use of codes.

Future Additions

The present RUN WILD is a "skeletal" system. Most of the data stored in the files were collected to help satisfy requirements of the Resource Planning Act of 1974. Yet, RUN WILD is limited only by the development of new files and the rate at which additional data can be collected and stored. New files that are planned during the next five years for Arizona and New Mexico will make the system even more dynamic and powerful as a practical working tool for the field biologist. Future additions will include:
1. Wildlife food plants of the Southwest.
2. Deer and elk habitat management.
3. Aspen management for wildlife.
4. Riparian habitat management.
5. Snag management for nongame birds.
6. Species profile (life form) for Arizona and New Mexico.

7. Effects of fire on wildlife habitat.
8. Effects of grazing on wildlife habitat.
9. Fish habitat classification and improvement.
10. Timber wildlife relations in ponderosa pine and mixed conifer forests.

Because many agencies and people outside the Forest Service will not have access to a computer for storing the RUN WILD system, the Rocky Mountain Forest and Range Experiment Station plans to publish the most important files. The great advantage of computer storage and retrieval is that data can be kept current. Conversely, data in manuscripts can become out of date in a very short time.

Literature Cited

Brown, David E., and Charles H. Lowe. 1974. The Arizona system for natural and potential vegetation—illustrated summary through the fifth digit for the North American Southwest. J. Ariz. Acad. Sci. Vol. 9, Suppl. 3. 56 p.

Brown, David E., Charles H. Lowe, and Charles P. Pase. 1977. Biotic communities of the Southwest (map). USDA For. Serv. Gen. Tech. Rep. RM-41. Rocky Mt. For. and Range Exp. Stn., Fort Collins, Colo. [In Press]

McGuire, John. 1973. Coordination—Fact or fallacy. Opening remarks for Timber-Wildlife Coordination Workshop. *In* Proceedings Service-wide timber-wild. coord. workshop. USDA For. Serv. Southern Region, Asheville, N.C. 153 p.

Thomas, Jack W. et al. 1976. Guidelines for maintaining and enhancing wildlife habitat in forest management in the Blue Mountains of Oregon and Washington. Trans. Forty-first North Am. Wildl. and Nat. Resour. Conf. March 21-25, 1976. Wildl. Manage. Instit., Washington, D.C. 634 p.

Patton, David R. 1978. RUN WILD: A storage and retrieval system for wildlife habitat information. Gen. Tech. Rep. RM-51, 8 p. Rocky Mt. For. and Range Exp. Stn., For. Serv., U.S. Dep. Agric., Fort Collins, Colo. 80521.

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Keywords: Wildlife habitat, endangered species, species distribution.

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